DOCUMENT RESUME

ED 090 360 CE 001 182

AUTHOR Panitz, A.
TITLE A National Effort of Experience Evaluation by Occupational Competency Examinations.
PUB DATE 5 Dec 73
NOTE 12p.; Paper presented to American Vocational Research Association (Atlanta, George, December 1973)

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS *Performance Based Teacher Education; *Teacher Education; Teacher Evaluation; *Teacher Improvement; Vocational Education; *Vocational Education Teachers
IDENTIFIERS *Occupational Competency

ABSTRACT

Without objective measures of occupational competence, it is not possible to ascertain whether the prospective teacher possesses the broadly-based level of competence essential for effective teaching. Each occupation contains elements which distinguish the competent tradesman (the author identifies seven). Assurance is required that the level and range of occupational competence of the future teacher is adequate to meet youth and adult training needs, and there is convincing evidence that measures beyond the paper and pencil test are needed to evaluate the skill phase of competence. A National Occupational Competency Testing Institute (NOCTI) has been established to assure effective continuing service to vocational education; the Educational Testing Service will administer and score the NOCTI examinations nationally, report the test results, carry on research, and develop additional tests. (The test development procedure, an evaluation of test results, a discussion of test use, and a description of the contents of an examination packet are included briefly in the document.) (AJ)

ED 090360

AMERICAN VOCATIONAL RESEARCH ASSOCIATION

Atlanta, Georgia December 5, 1973

A NATIONAL EFFORT OF EXPERIENCE EVALUATION

by

OCCUPATIONAL COMPETENCY EXAMINATIONS

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Dr. A. Panitz

National Occupational Competency Testing Institute

Educational Testing Service

Princeton, N.J.

CE001182

NEED FOR OCCUPATIONAL COMPETENCY EVALUATION

When vocational training became a school responsibility through the passage of the Smith-Hughes Act in 1917, the selection of occupationally competent people for teaching became a major responsibility of teacher educators and vocational administrators. With the growth of vocational education the need for objective, valid, and reliable instruments for the evaluation of occupational competence has become more and more urgent.

Whether vocational education relates to the preparation of youth, new workers or the retraining or upgrading of adults; whether the training is carried on in educational institutions, industry, by unions or the military, there is a force common to all to make the potential manpower actual manpower. That force is the occupational competence of the teachers.

NEED FOR OBJECTIVE MEASURES

Without objective measures of occupational competence, it is not possible to ascertain whether the prospective teacher possesses the broadly-based level of competence essential for effective teaching.

The search for such measures has been carried on for many years, but only spcradically. It has been well known that few states have the financial resources, facilities or the personnel to develop reliable and valid comprehensive examinations which can be efficiently administered

and provide test scores that can be readily interpreted. Yet is was also known that a number of states were and are now using occupational competency tests.

A small and determined group of individuals continued their efforts over the years but each in his own location. The first breakthrough occurred when two workshops at Rutgers University strongly urged a national effort for the development of National Occupational Competency Evaluative Instruments.

Under the leadership of Carl Schaefer, Mel Barlow, Thomas Olivo and Richard Nelson, a grant was obtained from the U.S. Office of Education which resulted in the National Occupational Competency Testing Project. Its objective was threefold:

1. To establish a Consortium of States for Occupational Competency Testing;
2. Develop test procedures and develop tests in selected occupational areas and explore the possibility of testing on a national scale through a pilot testing program; and
3. Explore the desirability of a National Occupational Competency Testing Institute for reproduction, distribution, scoring, statistical analysis, and reporting back to the states.

THE SURVEY OF THE STATE OF THE ART

As a first step a survey was undertaken on a national scale which

covered industry, labor unions, the civil service, vocational divisions of state education departments, and the military. Included was a search of the literature. The most significant findings revealed extensive duplication of efforts and little opportunity for test evaluation and improvement.

DEFINITION OF OCCUPATIONAL COMPETENCY

The State of the Art definitely provided the direction in which to proceed. The nature of the instruments to be developed depended upon what exactly was to be evaluated. Occupational competency is a variable which is difficult to define. It includes tasks which are performed by tradesmen at various levels. It involves information, judgement, facts and how to apply them to work situations and a wide variety of manipulative skills which are required by daily work. The key for determining occupational competency of future vocational teachers is competency at an acceptable level. Each occupation contains elements which distinguish the competent tradesman from the less competent. Among the more easily recognizable elements are the following:

1. He has command of the manipulative skills of his occupation in terms of technique, quality of work, and speed of performance
2. He is able to diagnose and correct troubles and solve problems typical of the kind encountered in the performance of his occupation

3. He can plan his work efficiently
4. He has knowledge of technical facts, underlying scientific principles, and is able to apply this knowledge to specific work assignments
5. He is able to make all computations necessary to his work
6. He can interpret drawings, diagrams, specifications and other directions pertinent to his field.

Broadly stated, an individual is considered competent when he can carry on the work of the occupation at or above a certain level and within a broad range of assignments.

The key to occupational competency definition is the LEVEL at which the tradesman functions. The vocational program administrator and the industry the program serves must have assurance that the level and range of occupational competence of the future teacher is adequate to meet the full spectrum of youth and adult training needs.

KINDS OF INSTRUMENTS NEEDED

The dominant practice in nearly all forms of evaluation is the pencil and paper test. It is objective, can be administered easily, and the results can be scored and reported easily and rapidly. There are points of view which hold that occupational competency can be evaluated by this means.

There is, however, convincing evidence that added measures are needed to evaluate the skill phase of occupational competence. In a study of norm

patterns applied to the selection of trade and technical teacher candidates, Reilly concluded that written examinations alone are a poor predictor of trade competence. Stuif, who conducted extensive work on performance measures for the Navy during World War II, concluded that performance and improved shop grades were not closely related to written test grades. On the other hand, Hankin stated that the correlation should be high if the study population from which the scores are drawn represent a normal range of competence, from low to high. If such correlations are low on one or the other of the tests, usually the written test is weak.

The notion that if there is a high correlation only the written test would be needed derives from other fields of testing such as mental ability; where the intention is to isolate independent traits such as space perception and verbal masoning.

~~In measuring~~ The occupationally competent worker has both types of ability and they are not independent. It's only by written and performance tests that the breadth of competency can be evaluated.

On the basis of available research data, combined with field studies and results obtained from a Pilot Testing program it became evident early in the Project, that occupational competency evaluation by means of examinations required both written and performance tests.

DETERMINATION OF TEST CONTENT

Vocational educators have long ago established a valid and reliable procedure for determining the learning or instructional content of an

occupation through occupational analysis. This method has served us well and proved to be, with minor modification, a very practical way for determining the content for occupational competency examinations. Such an analysis must provide the necessary information for the written test and the skills to be evaluated by the performance test.

As indicated earlier, many industrial occupations involve clusters of jobs ranging from the specialist to the all around tradesman. The first step in this analysis was to establish job clusters representing several levels of competence; then examine each level for facts, information, judgments, computations, and kinds of directions a competent man applies. Similar determination was made for the manipulative skills, their frequency of use, degree of complexity and commonality throughout the job clusters.

Such as analysis requires great care and must be made by individuals representing a broad spectrum of the occupation who are recognized for their competence. They must be assisted by teacher educators and/or test technicians with special skills in competency analysis.

TEST DEVELOPMENT PROCEDURE

While the analysis of the items which constitute occupational competence is a formidable task it is really only one of the steps required for test development. Since it is not possible to include all items of an analysis in either the written or performance test, careful planning must determine appropriate sampling of all areas of competence, exclusion of

regional preferences and practices, and determine the physical feasiblity of performance demonstration. The survey of the State of the Art clearly established the need of a practical and reliable procedure which was applicable to all occupations.

The following ten step procedure was developed and followed with satisfying results:

1. Establishment of an Advisory Committee consisting of representatives of industry and/or occupations to determine the levels of competence and overall test content.
2. Designation of recognized and competent individuals and analysis specialists to conduct the occupational analysis.
3. Designation of individuals from the occupation, vocational teachers and test technicians to prepare a test grid for adequate coverage of all areas of the occupation.
4. Preparation of test items for written and performance tests by individuals from industry, test technician and vocational teachers.
5. Organization of test items into a first draft test by test technician.
6. Test administration to one or several outstanding craftsmen in the occupation for review and comment.

7. Test revision according to responses and recommendations
8. Test submitted to professional testing organization such as Educational Testing Service, Psychological Corporation for review and revision.
9. Pilot administration of tests to obtain data and check test administrative procedures.
10. Scoring, reporting to candidates -- followed by statistical analysis, item analysis and test revision.

NUMBER OF TESTS COMPLETED

Even a casual review of this procedure indicates that most states and/or institutions do not have the resources -- personnel, finances, and/or technical know-how to carry on a comprehensive occupational competency test development program. Through the grant provided by the U.S. Office of Education and with the cooperation of vocational teacher educators, state directors of vocational education and supervisors of trade and industrial education, examinations have been developed in twenty-four major occupations. Each examination consists of a written and a performance test. Two forms have been developed for each occupation.

EVALUATION OF TEST RESULTS

For the first time in vocational education these tests were administered through pilot testing programs in twenty-four test centers in nearly all regions of the country from a central location. The pilot testing program provided adequate data for statistical treatment of the results and test evaluation through item analysis and other appropriate measures.

While it is not possible within the limitations of this presentation to provide specific data for each test perhaps some general comments about the quality of the tests might be of interest. The data for the written tests showed a reliability range from .882 to .925. The mean for item difficulty ranged from .480 to .0510 and item discrimination from .325 to .410. For a first effort these results are indeed promising. More importantly, we now have information which enable further test improvement. The performance test, more difficult to evaluate, proved equally promising data. More subjective in nature than the written test, the observations of the candidates were made according to a predetermined evaluation scale. The examiners had to confine their judgments to predetermined items on the evaluation scale. Spot inspection during performance tests revealed a high correlation of ratings among performance examiners.

The pilot testing proved that the test quality was good. It provided the practicality of administering centrally developed tests on a national scale.

HOW CAN THE TESTS BE USED?

The question may be raised as to the proper use of these tests. Although originally developed to assist teacher educators and vocational administrators in the appraisal of candidates for admission to industrial teacher education programs, they provide objective evidence for occupational competence for certification and for experience evaluation for

degree programs. The National Occupational Competency Testing Institute has been established on a permanent basis to provide the kind of testing service which has long been needed by the states.

WHAT CONSTITUTES AN EXAMINATION PACKAGE?

So far we have talked about the background, method, use, quality, and number of the tests. Now let's briefly describe what constitutes a test package.

The following materials are provided:

1. A Bulletin for the candidate which describes in general terms the testing program, the basic eligibility requirements, and how he can register.
2. A Scope of the Written and Performance Tests for each occupation which tells the candidate the content of the examination.
3. A Manual for Administering Written and Performance Tests for examiners.
4. Directions to the performance examiner with detailed instructions for the preparation of shops or laboratories — materials required, tools, machines, equipment, and facilities needed as well as performance evaluation directions.
5. The Written Test
6. The Performance Test

SUMMARY

After many years of strenuous efforts, a National Occupational Competency Testing Institute has been established to assure effective, continuing service to vocational education. The Institute functions under the administrative direction of the Consortium of States for Occupational Competency Testing of Future Vocational Teachers and will render services determined by a representative board and thus maintain close contact with the needs of the states.

The Institute has obtained contractual commitments from the Educational Testing Service to administer and score the NOCTI examinations nationally. ETS will report the test results, carry on research and employ its resources in the development of additional tests. ETS is a non-profit organization and the leader in test development, conduct of test programs, and research in education as well as vocational qualifications. By taking this action the Institute combines the sophisticated test experience of ETS with the practical approaches developed during the research and development phases of the project.

This is a breakthrough in occupational competency evaluation which will serve to improve vocational teacher competence, raise professional recognition of vocational teachers, and contribute to further improved vocational education.